



Specification for Approval

Customer:

Model Name:

Supplier Approval			Customer approval
R&D Designed	R&D Approved	QC Approved	
<i>Peter</i>	<i>Peng Jun</i>		



AM-320240-020D-1

Version: B

2016.07.29

Revision Record

REV NO.	REV DATE	CONTENTS	Note
A	2016.05.16	NEW ISSUE	
B	2016.07.29	Modify Luminous Intensity for LCM	



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1. Scope

This specification defines general provisions as well as inspection standards for TFT module supplied by AMSON electronics.

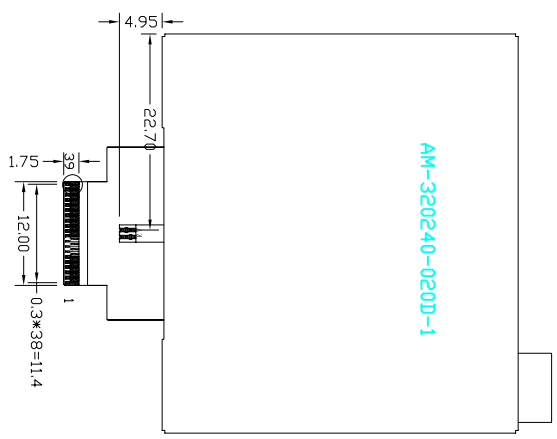
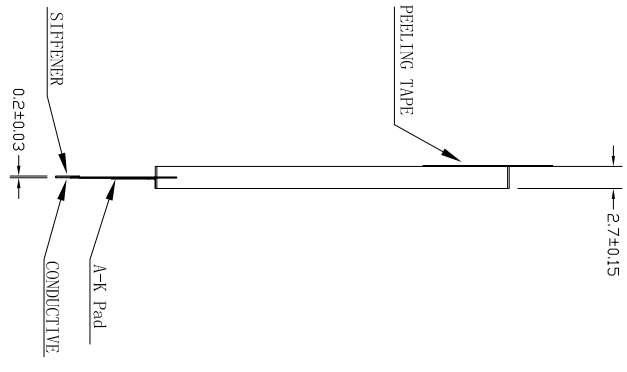
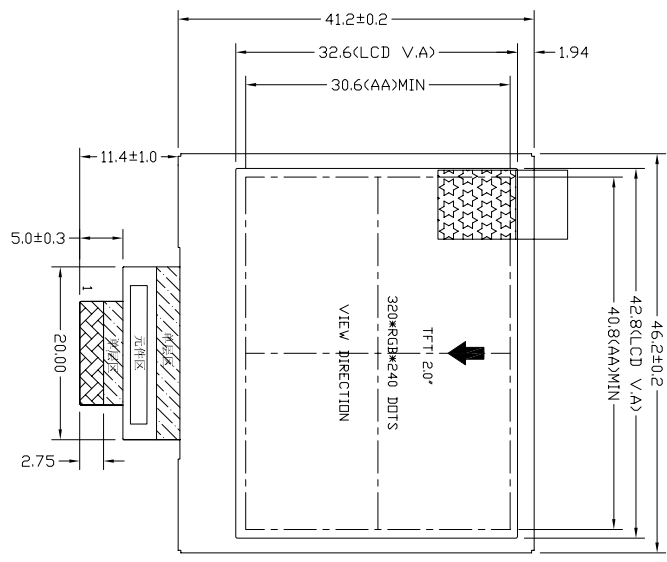
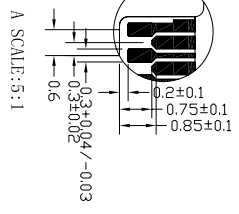
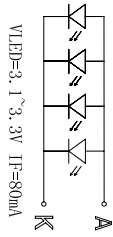
If the event of unforeseen problem or unspecified items may occur, naturally shall negotiate and agree to solution.

2. General Information

ITEM	STANDARD VALUES	UNITS
LCD type	2.0" TFT	
Dot arrangement	320(H)*(RGB)*240(V)	dots
Color filter array	RGB vertical stripe	
Display mode	TN / Transmission / Normally White	
Viewing Direction	12 o'clock	
Driver IC	ILI9342C	
Module size	46.2(W)×41.2(H)×2.7(T)	mm
Active area	40.8 (W)×30.6(H)	mm
Dot pitch	0.1275 (W)×0.1275 (H)	mm
Interface	8bit serial(RGB) data input	
Operating temperature	-20 ~ +70	°C
Storage temperature	-30 ~ +80	°C
Back Light	4 White LED	
Weight	TBD	g

3.External Dimensions

1. Do not scale drawing
2. Modification rev. number
3. Draft angle 1.5°
4. Operating Temperature: -20~+70° C
5. Storage Temperature: -30° C~+80° C
6. ROHS must be complied (Use lead-free process)
7. IC Driver: LLR342C
8. Luminous Intensity for LCM: 700cd/m²(TYP.)
9. reference dimension



SNV.	DESCRIPTION OF REVISION	REASON	REVISED BY	DATE
△	first issue	A		2016/05/17
△	Modify Luminous	B		2016/07/29

YU DU AMSON ELECTRONICS CO., Ltd.		于都上晴电子有限公司	
TITLE: OUTLINE DIMENSION	D/N: AM-320240-020D-1	DATE:	
DRAWN BY:	Rev: B	UNIT: mm	
CHECKED BY:	SCALE: 1:1	SHEET NO: 1 OF 1	
APPROVED BY:			



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4. Interface Description

Pin	Symbol	Description.
1	VGL	Power supply for the gate driver. Adjust the VGL level with the BT[3:0] bits. Connect this pad with a stabilizing capacitor.
2	VGH	Power supply for the gate driver. Adjust the VGH level with the BT[3:0] bits. Connect this pad with a stabilizing capacitor.
3	C1N	Connect the charge-pumping Capacitor on C1N/C1P for
4	C2N	Connect the charge-pumping Capacitor on C2N/C2P for
5	C1P	Connect the charge-pumping Capacitor on C1P/C1N for
6	C2P	Connect the charge-pumping Capacitor on C2P/C2N for
7	GND	Ground
8	VDD3	Charge-pump circuit reference voltage. Please connect the capacitor between VDD3 and VSS.
9	VDD_25V	Intermediate voltage for charge Pump. Please connect the capacitor between VDD_25V and VSS.
10	VCAC	Define the amplitude of the VCOM swing
11	C3N	Connect the charge-pumping capacitor on C3N/C3P for
12	C3P	
13	NC	Dummy
14	LEDK	LED backlight (Cathode).
15	NC	Dummy
16	LEDA	LED backlight (Anode).
17	NC	Dummy
18	GND	Ground
19	NC	Dummy
20	VDD	Power voltage input
21	NC	Dummy
22	GND	Ground
23	VSYNC	Vertical sync input
24	HSYNC	Horizontal sync input
25	GND	Ground
26	DCLK	Data clock input
27	DB0	Data input
28	DB1	Data input



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29	DB2	Data input
30	DB3	Data input
31	DB4	Data input
32	DB5	Data input
33	NC	Dummy
34	NC	Dummy
35	SDA	Serial communication data input
36	SCL	Serial communication clock input
37	GND	Ground
38	CS	Serial communication chip select
39	RESET	This signal will reset the device and must be applied to properly initialize the chip.

5. Absolute Maximum Ratings

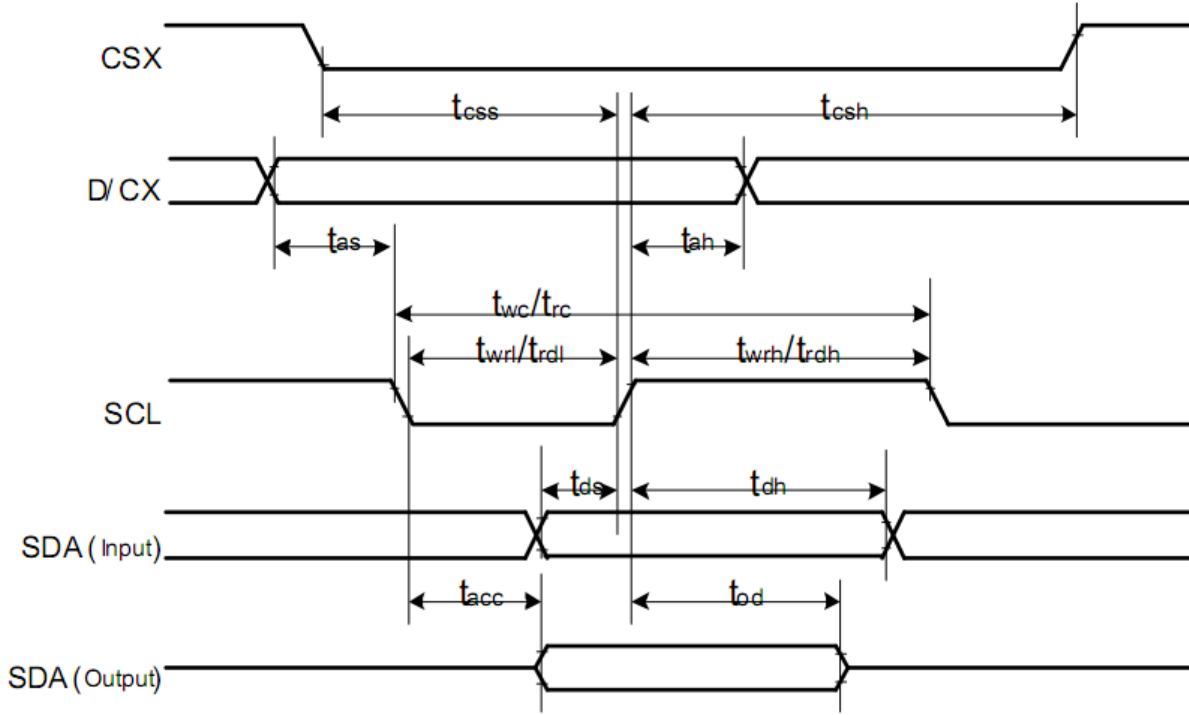
Item	Symbol	Min.	Max.	Unit
Logic Supply Voltage	VDD	-0.5	4.6	V
Input Voltage	VIN	0	VDD	V
Operating Temperature	TOP	-20	70	°C
Storage Temperature	TST	-30	80	°C
Storage Humidity	HD		90	%RH

6. DC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply Voltage	VDD	-	2.8	3.3	V	-
Input High Voltage	V _{IH}	0.7VDD		VDD	V	Digital input pins
Input Low Voltage	V _{IL}	GND		0.3VDD	V	Digital input pins
Output High Voltage	V _{OH}	0.8VDD		VDD	V	Digital output pins
Output Low Voltage	V _{OL}	GND		0.2VDD	V	Digital output pins
I/O Leak Current	I _{LI}	-0.1		0.1	uA	-

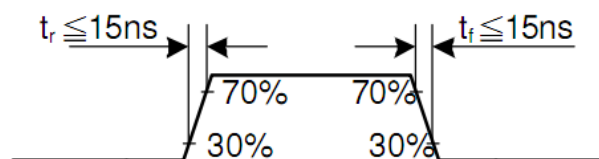
7. Timing Characteristics

Display Serial Interface Timing Characteristics (4-line SPI system)



Signal	Symbol	Parameter	min	max	Unit	Description
CSX	t_{css}	Chip select time (Write)	30	-	ns	
	t_{csh}	Chip select hold time (write)	30	-	ns	
SCL	t_{wc}	Serial clock cycle (Write)	100	-	ns	
	t_{wrh}	SCL "H" pulse width (Write)	35	-	ns	
	t_{wrl}	SCL "L" pulse width (Write)	35	-	ns	
	t_{rc}	Serial clock cycle (Read)	150	-	ns	
SCL	t_{rdh}	SCL "H" pulse width (Read)	60	-	ns	
	t_{rdl}	SCL "L" pulse width (Read)	60	-	ns	
D/CX	t_{as}	D/CX setup time	10	-		
	t_{ah}	D/CX hold time (Write / Read)	10	-		
SDA (Input)	t_{ds}	Data setup time (Write)	30	-	ns	
	t_{dh}	Data hold time (Write)	30	-	ns	
SDA (Output)	t_{acc}	Access time (Read)	-	50	ns	For maximum CL=30pF
	t_{od}	Output disable time (Read)	15	50	ns	For minimum CL=8pF

Note: $T_a = 25\text{ }^\circ\text{C}$, $IOVCC=1.65\text{V to }2.8\text{V}$, $VCI=2.6\text{V to }3.3\text{V}$, $AGND=GND=0\text{V}$





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8. Backlight Characteristics

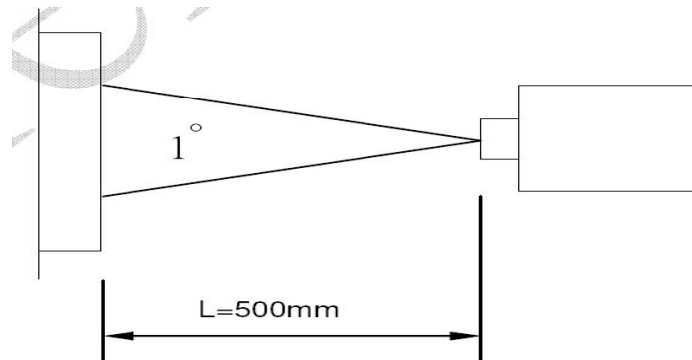
Item	Symbol	MIN	TYP	MAX	UNIT	Test Condition
Supply Voltage	Vf	2.9	3.1	3.3	V	If=80mA
Supply Current	If		80		mA	
Luminous Intensity for LCM		600	700		Cd/m ²	If=80mA
Uniformity for LCM		80			%	If=80mA
Life Time		50000			Hr	If=80mA
Backlight Color	White					

9. Optical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Transmittance	T			6.5		%	
Contrast Ratio	CR			690			Note3
Response Time	Tr+Tf	25°C		21	42	ms	Note4
Viewing Angle	3H	θ 3H(R)	CR≥10	45	60		Note5
	9H	θ 9H(L)		45	55		
	6H	ϕ 6H(D)		10	60		
	12H	ϕ 12(U)		30	60		
Color Filter Chromaticity	White	x	$\theta = \phi = 0^\circ$		0.31		Note6
		y			0.34		
		λ			TBD		
	Red	x	$\theta = \phi = 0^\circ$		TBD		
		y			TBD		
		λ			TBD		
	Green	x	$\theta = \phi = 0^\circ$		TBD		
		y			TBD		
		λ			TBD		
	Blue	x	$\theta = \phi = 0^\circ$		TBD		
		y			TBD		
		λ			TBD		

Note1.Ambient condition: 25° C±2° C, 60±10%RH, under 10 Lux in the darkroom.

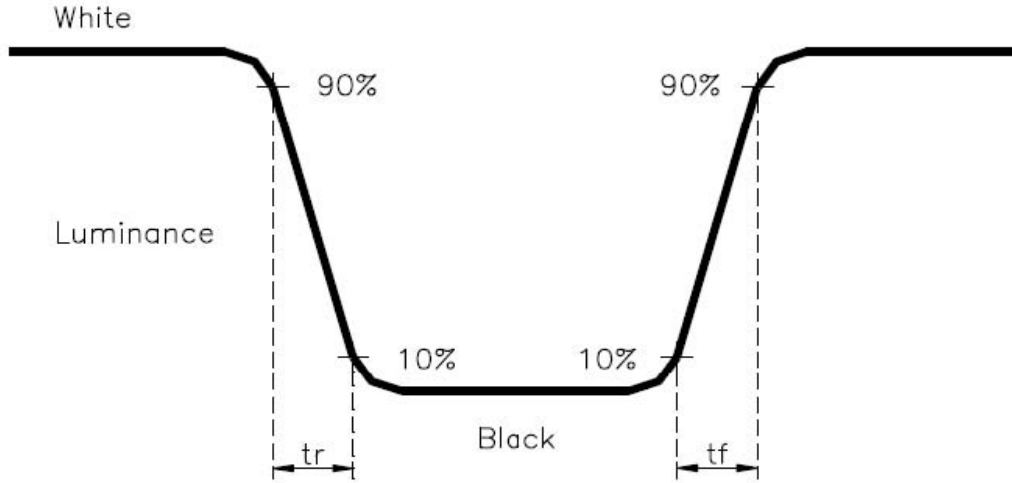
Note2.Measure device:BM-5A(TOPCON),viewing cone=1° , IL=80Ma.



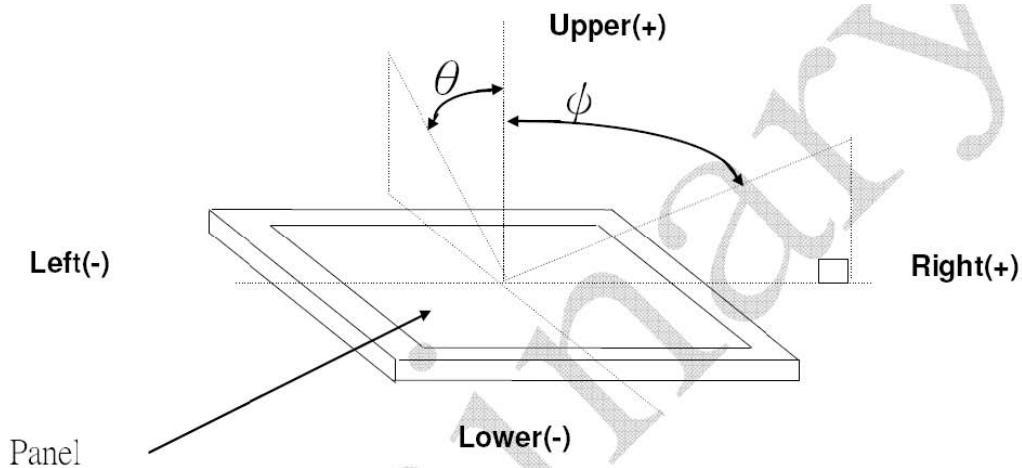
Note3. Definition of Contrast Ratio:

CR = White Luminance (ON) / Black Luminance (OFF)

Note4. Definition of response time: The response time is defined as the time interval between the 10% and 90% amplitudes



Note5. Definition of view angle(θ , ϕ):



Note6. Light source: C light



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10. Reliability Test Conditions and Methods

NO.	TEST ITEMS	TEST CONDITION	INSPECTION AFTER TEST
<input type="checkbox"/>	High Temperature Storage	80°C±2°C×200Hours	Inspection after 2~4hours storage at room temperature, the samples should be free from defects: 1, Air bubble in the LCD. 2, Seal leak. 3, Non-display. 4, Missing segments. 5, Glass crack. 6, Current IDD is twice higher than initial value. 7, The surface shall be free from damage. 8, The electric characteristic requirements shall be satisfied.
<input type="checkbox"/>	Low Temperature Storage	-30°C±2°C×200Hours	
<input type="checkbox"/>	High Temperature Operating	70°C±2°C×120Hours	
<input type="checkbox"/>	Low Temperature Operating	-20°C±2°C×120Hours	
<input type="checkbox"/>	Temperature Cycle(Storage)	-20°C (30min) 25°C (5min) 70°C (30min) 1cycle Total 10cycle	
<input type="checkbox"/>	Damp Proof Test (Storage)	50°C±5°C×90%RH×120Hours	
<input type="checkbox"/>	Vibration Test	Frequency:10Hz~55Hz~10Hz Amplitude:1.5M X,Y,Z direction for total 3hours (Packing Condition)	
<input type="checkbox"/>	Drooping Test	Drop to the ground from 1M height one time every side of carton. (Packing Condition)	
<input type="checkbox"/>	ESD Test	Voltage:±8KV,R:330Ω,C:150PF,Air Mode,10times	

REMARK: 1, The Test samples should be applied to only one test item. 2, Sample side for each test item is 5~10pcs. 3,For Damp Proof Test, Pure water(Resistance > 10MΩ)should be used. 4,In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part. 5, EL evaluation should be accepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has. 6, Failure Judgment Criterion: Basic Specification Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.



11. Handling Precautions

11.1 Mounting method

The LCD panel of AMSON TFT module consists of two thin glass plates with polarizers which easily be damaged. And since the module is so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

11.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent [Recommended below] and wipe lightly

- Isopropyl alcohol
- Ethyl alcohol

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.

Do not use the following solvent:

- Water
- Aromatics

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns

Do not use the following solvent on the pad or prevent it from being contaminated:

- Soldering flux
- Chlorine (Cl) , Sulfur (S)

If goods were sent without being silicon coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on. If ITO corrosion happens by miss-handling or using some materials such as Chlorine (Cl), Sulfur (S) from customer, Responsibility is on customer.

11.3 Caution against static charge

The LCD module uses C-MOS LSI drivers, so we recommend that you:

Connect any unused input terminal to VDD or GND, do not input any signals before power is turned on, and ground your body, work/assembly areas, and assembly equipment to protect against static electricity.

11.4 packing

- Module employs LCD elements and must be treated as such.
- Avoid intense shock and falls from a height.
- To prevent modules from degradation, do not operate or store them exposed direct to sunshine or high temperature/humidity

11.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage than the limit causes the shorter LCD life.
- An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD's show dark color



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in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.

- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- Slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.

Usage under the maximum operating temperature, 50%Rh or less is required.

11.6 storing

In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.

- Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it. And with no desiccant.
- Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
- Storing with no touch on polarizer surface by the anything else. [It is recommended to store them as they have been contained in the inner container at the time of delivery from us.

11.7 Safety

- It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.
- When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water.

12.Precautio n for Use

12.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

12.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification.
- When a new problem is arisen this is not specified in this specification.
- When an inspection specifications change or operating condition change in customer is reported to AMSON TFT and some problem is arisen in this specification due to the change. ● When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.

13.Packing Method

TBD